

IN THE SPECIFICATION:

Please amend the above-identified patent application Specification as follows:

Please replace the paragraph of specification page 3, beginning at line 9, with the following paragraph:

— A typical MEA includes a centrally disposed protonically conductive, electronically non-conductive membrane (“PCM”). One example of a commercially available PCM is [[Nafion]]NAFION ® (a registered trademark of E.I. Dupont de Nemours and Company), a cation exchange membrane comprised of perfluorocarbon polymers with side chain termini of perflourosulfonic acid groups, in a variety of thicknesses and equivalent weight. The PCM is typically coated on each face with an electrocatalyst such as platinum, or platinum/ruthenium mixtures or alloy particles. On either face of the catalyst coated PCM, the electrode assembly typically includes a diffusion layer. The diffusion layer functions to evenly distribute the liquid fuel mixture across the anode in the case of the fuel, or the gaseous oxygen from air or other source across the cathode face of the PCM. In addition, flow field plates are often placed on the surface of the diffusion layers that are not in contact with the coated PCM. The flow field plates function to provide mass transport of the reactants and by products of the electrochemical reactions, and they also have a current collection functionality in that the flow field plates act to collect and conduct electrons to the external wires connecting to the load. —

Please replace the second full paragraph of Specification page 8, beginning at line 15, with the following paragraph:

— The system 2, including the DMFC 3, has a fuel delivery system 4 to deliver fuel from an associated fuel source. The DMFC 3 includes a housing 5 that encloses a

membrane electrode assembly 6 (MEA). MEA 6 incorporates protonically conductive, electronically non-conductive membrane 7. PCM 7 has an anode face 8 and cathode face 10, each of which may be coated with a catalyst, including but not limited to platinum or a blend of platinum and ruthenium or a platinum/ruthenium alloy. The catalyst may be supported or unsupported, or dispersed within a recast ionomer blend. The portion of DMFC 3 defined by the housing 5 and the anode face of the PCM is referred to herein as the anode chamber 18. The portion of DMFC 3 defined by the housing and the cathode face of the PCM is referred to herein as the cathode chamber 20. Additional elements of the direct methanol fuel cell system such as flow field plates, and diffusion layers (not shown in Figure 1) may be employed to facilitate flow of reactants and byproducts and may also be included within anode chamber 18 and cathode chamber 20. Cathode effluent may be released to a gas separator 31, if desired in a particular application of the invention. —

Please replace the last paragraph of Specification page 8, which begins at line 28 and continues onto line 12 of page 9, with the following replacement paragraph:

— Referring now to Fig. 2, a membrane electrode assembly 6 has the centrally disposed, protonically-conductive membrane (PCM) 7. PCM 7 is impermeable to electrons and thus the electrons travel through the load providing electrical power. The PCM 7 is composed of a suitable material, such as poly perfluorovinylether sulfonic acid (which is commercially available as NAFION ® a registered trademark of E.I. Dupont de Nemours and Company). A catalyst [[10]]11, typically platinum or an alloy of platinum and ruthenium, is disposed between the anode diffusion layer 22 and PCM 7. A cathode catalyst 12, typically platinum, is also disposed between the cathode diffusion layer 24 and the PCM 7. The anode diffusion layer 22 would, in turn be in contact with an anode flow field plate 26. In some embodiments of the invention the flow field plate 26 and diffusion layer 22 may consist of one component. A cathode diffusion layer 24 is in

contact with cathode flow field plate 28. These components of the fuel cell are in well-defined contact with one another to promote electrical conductivity, and minimize contact losses. As will be understood by those skilled in the art, the MEA need not be a six layer device, but can contain fewer components when the functionality of several components are combined. —

Please replace the paragraph beginning at Specification page 9, line 28 with the following paragraph:

— In accordance with the present invention, a passive DMFC system is provided in which the fuel is delivered to the MEA 6 in such a manner that the fuel delivered is effectively consumed so that there is no need to recirculate unreacted fuel from the anode. This is possible based upon several aspects of the present invention. As will be understood by those skilled in the art, direct methanol fuel cells produce liquid water (H₂O) at the cathode and gaseous carbon dioxide (CO₂) at the anode as chemical products of the reaction. Prior systems, such as those set forth in Fig. 1, and in U.S. Patent 5,599,638, separate carbon dioxide produced in the anodic reaction out of the system to ambient air, by circulating any unreacted fuel mixture and carbon dioxide carried within it through gas separators located outside the fuel cell anode chamber, or allowing the carbon dioxide to be vented passively directly to the ambient environment at a vent located outside the fuel cell anode chamber, based on the tendency of gasses in a liquid solution to rise. Alternatively, the carbon dioxide may be used to perform work within the system. Such systems have been described in commonly-owned U.S. Patent No. 6,645,655, which is issued on November 11, 2003[[Application Serial No.: 09/717,754, filed on November 21, 2000,]] for a PASSIVELY PUMPED LIQUID FEED FUEL CELL SYSTEM, which is incorporated by reference herein in its entirety. —

Please replace the paragraph beginning at Specification page 10, line 14 with the following paragraph:

— Another method of utilizing the carbon dioxide is described in U.S. Patent No. 6,566,033, which issued on May 20, 2003[[Application Serial No.: 09/837,831, filed on April 18, 2001,]] for a METHOD AND APPARATUS FOR CO2 - DRIVEN MANAGEMENT FOR A DIRECT OXIDATION FUEL CELL SYSTEM, which discloses a method of using carbon dioxide to actively draw air to the cathode face of the protonically-conductive membrane. —

Please replace the paragraph beginning at Specification page 10, line 19 with the following paragraph:

— However, a direct methanol fuel cell may be simplified, in accordance with the present invention, by being constructed without the use of pumps if, in the first instance, the carbon dioxide is vented out of the system without having to circulate the fuel solution in which the carbon dioxide is contained. A schematic diagram of the invention, which implements a carbon dioxide separator enabling such passive selective venting of CO2[[CO2]], is set forth in Fig. 1A. —

Please replace the paragraph beginning at Specification page 14, line 19 with the following paragraph:

— It should be noted that for purposes of clarity of illustration, Figs. 6A and 6B show the gas permeable membrane sections on one side 61 of the anode chamber. It should be understood that gas permeable surfaces, windows or other shapes, can be configured on any aspect of the anode chamber, or on multiple aspects (or sides) of the chamber, while remaining within the scope of the present invention. —

Please replace the paragraph beginning at Specification page 16, line 8 with the following paragraph:

— The conduits 810 and 822 are valved (848, 849) and appropriate amounts, as adjusted for the desired methanol concentration, are introduced into a mixing chamber 850. Once mixed, the aqueous fuel solution is valved at valve 856 to the fuel flow plate and diffusion layers of the anode portion of a membrane electrode assembly of a fuel cell, such as that illustrated in Fig. 5. —

Please replace the paragraph beginning at Specification page 16, line 24 with the following paragraph:

— Another aspect of this embodiment of the invention is illustrated in Figs. 9 and 10. A fuel container and delivery assembly 900 (Fig. 9) has an exterior housing 902 which encloses a methanol solution container 904 and a water container 906. The methanol solution flows through the methanol conduit 910, and the water flows through water conduit 922. An interface 930, similar to interface 730, may also be provided. These conduits are shown in cross section in Fig. 10. The conduits include apertures along the walls thereof through which fluids can pass. The methanol passes through the walls of the conduit 1010 and into the anode diffusion layer 1001. In a similar fashion, water is dispersed to the fuel cell anode diffusion layer 1001 via openings in the flow channel 1012. The different liquids mix in the diffusion layer 1001 prior to being introduced to the protonically conductive membrane 1005 (which is also in intimate contact with cathode diffusion layer 1008). Valves can be used to control the amounts of fuel and/or water that are dispersed into the respective diffusion layer. —